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ABSTRACT

Research provided information about the magnitude of an individual's enlistment probability and how that probability depends on his personal characteristics, family background, employment situation, and expectations for further education. Analysis focused on male high school seniors and high school graduates. Findings suggested that each segment contains important subsegments defined by the individual's expectations for further education. Graduates were more responsive to work-related variables; seniors were more affected by education-related variables. The responsiveness to each variable often differed significantly across the subsegments defined by educational expectations. Findings permitted prediction of the enlistment probability of each individual in the sample, given his personal characteristics. These predicted probabilities showed that large relative differences can be discerned in the enlistment probabilities of young men with diverse characteristics. Findings were recommended to aid recruiters in evaluating the likely payoff from different segments and subsegments of their recruiting markets. The findings suggested that changes in the economic environment will influence different subsegments of the recruiting market differently and that in most segments the decision to enlist is not related to family income. Implications were reported for the design of aggregate data models for analyzing and forecasting enlistments and for expanded use of microlevel enlistment models. (YLB)

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Educational Expectations and Enlistment Decisions

James R. Hosek, Christine E. Peterson, Rick A. Eden

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PREFACE

This report focuses on the role of educational expectations in the enlistment decisions of young men who are high school seniors or non-student, high school graduates. The report examines the differences in enlistment behavior between individuals who expect more education after high school graduation and those who do not, and addresses the implications of those findings for recruiting policy. The results should interest recruiters, policymakers concerned with recruiter allocation and effectiveness, advertisers involved in developing advertising campaigns for the armed forces, and analysts working with models of enlistment that draw upon either aggregate or individual-level data.

This study extends work presented in Rand report R-3238-MIL, *Enlistment Decisions of Young Men*, by James R. Hosek and Christine E. Peterson, July 1985. Readers interested in a comprehensive technical discussion of the enlistment model used to generate the results presented here should consult that report.

The research reported here was undertaken by Rand's Defense Manpower Research Center under contract to the Office of the Assistant Secretary of Defense for Force Management and Personnel.

SUMMARY

The active duty forces recruit over a quarter million young men each year. Over the next ten years the military may find it difficult to fill this manpower requirement. The competition for young labor will intensify since the number of young men will decrease and as a consequence their civilian wages will tend to rise more rapidly than the average civilian wage. To compete successfully in such an environment the Armed Forces must target their recruiting efforts cost-effectively. Toward this end, our research provides new information about the magnitude of an individual's enlistment probability and how that probability depends on his personal characteristics, family background, employment situation, and, especially, expectations for further education. This information can aid the military in defining distinct segments of the recruiting market and subsequently in designing tactics and allocating resources appropriate to each segment.

Our study is distinctive in several respects. First, we analyze actual enlistment behavior, not enlistment intentions. Second, unlike most enlistment studies, we analyze the behavior of individuals, not aggregates. And third, we use a large, specially constructed database that permits us to analyze enlistment behavior closely in distinct segments of the recruiting market. The data are from spring 1979. Recruiting was extraordinarily difficult at that time, and recruitment policies differed somewhat from those now; however, since most enlistments were chiefly supply-determined—that is, the number of enlistments was limited by the supply of recruits available rather than by the number required by the services—it is a good period in which to analyze the relationship between an individual's personal characteristics and his enlistment probability.

MAJOR SEGMENTS OF THE RECRUITING MARKET

Our analysis focuses on the two segments of the recruiting market that supply the bulk of enlistments. These are the high school seniors and the high school graduates who are not students—or *seniors* and *graduates*, for short. Our findings suggest that each of these segments contains important subsegments defined by the individuals' expectations for further education. The distinction between young men who do and do not expect more education is important for recruiting purposes because educational expectations heavily influence an individ-

ual's decisionmaking as he chooses among further schooling, civilian work, and enlistment.

WHO ENLISTS AND WHY

Overall we find that graduates are more responsive to work-related variables than are seniors. Work-related variables include employment status, wage rate, weekly hours of work, labor force experience, job tenure, and duration of joblessness (if not employed). The more success a graduate enjoys in the civilian labor market, the less likely he is to enlist. Seniors are more affected than graduates by education-related variables. These include learning proficiency, ability to finance further education, and parental influence. Further, we find that the responsiveness to each variable often differs importantly across the subsegments defined by educational expectations.

Consider, for example, the pattern of interactions between a key measure of learning proficiency—Armed Forces Qualification Test (AFQT) score—and educational expectations. Among seniors, the higher the AFQT score, the lower the likelihood of enlistment. This is true regardless of the senior's educational expectation. The story differs for graduates. Among graduates who expect more education, enlistment probability increases with AFQT score, suggesting that such individuals may be attracted to the military's opportunities for education and training. By contrast, among graduates who do not expect more education, enlistment probability decreases as AFQT score rises. The interactions between educational expectations and other variables provide similar insights into the recruiting market.

EVALUATING ENLISTMENT PROSPECTS

Do the enlistment probabilities of individuals vary widely enough in predictable ways to make targeting specific subsegments worthwhile? The answer appears to be Yes. Our findings permit us to predict the enlistment probability of each individual in our sample, given his personal characteristics. These predicted probabilities show that one can discern large relative differences in the enlistment probabilities of young men with diverse characteristics. When we group predicted probabilities into deciles (each containing a tenth of our male youth population), *within* each segment individuals whose probabilities fall in the upper deciles (80th to 90th percentile, for example) are several times more likely to enlist than those in the lower deciles. In addition, we find that the distribution of predicted probabilities varies *among* the

different subsegments of the recruiting market. For example, when graduates are split by educational expectations, the average probability of enlistment among those in the fifth decile of the group who expect more education is about twice that of those in the fifth decile of the group who do not.

IMPLICATIONS FOR RECRUITING POLICY AND STRATEGY

Our findings should help recruiters to evaluate the likely payoff from different segments and subsegments of their recruiting markets. For instance, when working the graduate market, recruiters may want to focus on recent high school graduates, since the longer a graduate remains in the civilian labor market, the less likely he is to enlist. They may also want to focus on graduates who expect more education, since, as noted above, these are more likely to enlist than those who do not. The subsegment of graduates expecting more education may be a promising source of high-quality enlistments, since among this group the propensity to enlist rises with AFQT score.

Recruiters should understand that changes in the economic environment will influence different subsegments of the recruiting market in different ways. For example, if youth wages decline across the civilian labor market, then enlistments can be expected to increase as follows: the greatest relative increase will be among seniors who do not expect more education, next among graduates who do not expect more education, and then among seniors and graduates who do expect more education.

Similarly, if civilian wages rise relative to military pay, as is widely expected, then the military should expect proportionately fewer recruits who are seniors, have high AFQT scores, or do not want more education. Put another way, the relative increase in civilian wages will add more to the cost of recruiting seniors than graduates and, within each of these segments, more to the cost of high-AFQT than low-AFQT individuals.

Our findings also suggest, contrary to the common wisdom, that in most segments of the recruiting market the decision to enlist is not related to family income. Only among seniors who expect more education does enlistment probability fall as family income rises. These seniors, desiring to pursue higher education, are more likely to have the means the higher their family income. For other subsegments, in which family income is lower on average, the military appears to draw neutrally across different family income strata.

IMPLICATIONS FOR FUTURE RESEARCH

The utility of our findings suggests that aggregate models for analyzing and forecasting enlistments should become more disaggregated. Models should distinguish seniors from graduates, since the behavior of these two segments frequently differs, and should include additional variables that influence individual enlistment behavior, particularly variables concerning further education, e.g., family income and intentions to obtain additional schooling.

Finally, our results encourage further microanalysis of enlistment. The micromodel developed in this work could be adapted to consider topics including choice of military service, active versus reserve enlistment, choice of military occupational area, enlistment behavior of women versus men, and the joint analysis of enlistment and post-enlistment outcomes (attrition, promotion, reenlistment).

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I. INTRODUCTION

To sustain military force strength, the active duty forces enlist upwards of a quarter million young men each year. Over the next decade this objective must be met despite a declining youth population and an anticipated growth in the number of civilian labor market jobs for young workers. The Service recruiting commands cannot rely on the possibility of a cyclical downturn and an extended recession to meet these demands, nor upon the assumption that military compensation will stay fully abreast of private sector earnings opportunities. Rather, it is essential to review enlistment strategies, to design effective enlistment incentives and advertising, and to allocate recruiters efficiently across and within recruiting markets.

This report expands on and discusses policy implications of an econometric analysis of the enlistment decisions of young men.[1] The analysis provides new insight into enlistment behavior in key segments of the recruiting market—high school seniors and nonstudent high school graduates—and, more importantly, into enlistment behavior within subsegments of those markets defined by whether individuals expect to obtain further education.

The findings are based on an analysis of actual enlistment behavior, not enlistment intentions. The study deals with the behavior of individuals, not aggregates, and it utilizes a specially constructed database that for the first time permits intensive investigation of enlistment behavior among separate segments of the male youth recruiting market. The database was created by combining two existing surveys, one containing enlistees (the 1979 DoD Survey of Personnel Entering Military Service [AFEES]), the other containing nonenlistees (1979 wave of the National Longitudinal Survey of Labor Force Behavior, Youth Survey [NLS]).[2] Each survey was conducted in the spring of 1979 and gathered similar information on individual characteristics. While spring 1979 was a difficult recruiting period, it was an advantageous time for data collection for our study, since at that time the vast majority of enlistments were supply-determined, i.e., the number of

[1]James R. Hosek and Christine E. Peterson, *Enlistment Decisions of Young Men*, The Rand Corporation, R-3238-MIL, July 1985.

[2]For a detailed discussion of the creation of the AFEES-NLS database, see James R. Hosek and Christine E. Peterson, *The AFEES-NLS Database: A Choice-Based Sample for Studying Enlistment and Post-Enlistment Outcomes*, The Rand Corporation, N-1930-MRAL, January 1983.

enlistments was limited by the supply of recruits available rather than by the number required by the Services. Our database contains many more observations on senior and graduate enlistees (over 2700) than could have been expected from the NLS alone (less than 100), or indeed from a point-in-time random sample of several hundred thousand observations. With the large number of enlistees in our data, we are able to conduct a detailed analysis of individual enlistment decisions, employing many explanatory variables and investigating different segments of the recruiting market.[3]

Our research discovers major differences in the enlistment behavior of key groups in the male youth recruiting market. These groups are seniors who expect more education, seniors who do not expect more education, and nonstudent high school graduates who do or do not expect more education. Together, the groups are the primary source of young men who enter the service with a high school diploma and score well on the Armed Services Vocational Aptitude Battery (ASVAB).

We analyze the relationship between an individual's enlistment probability and variables determining enlistment, including his personal characteristics, family background, employment situation, and educational expectations. The results indicate that the effects of many variables depend not only on whether the individual is a senior or graduate, but on whether he expects to obtain more education. For instance, among seniors who expect more education, enlistment probability falls as family income rises, but family income has no effect on the enlistment probability in the other groups. In addition, seniors and graduates who do expect more education are less sensitive to wage variation than are seniors and graduates who do not expect more education. Our estimated relationships offer ample explanatory power to discriminate among young men in the various groups in terms of their predicted probabilities of enlistment.

In the remainder of the report, Sec. II empirically defines useful segments of the recruiting market, and Sec. III focuses on the role of educational expectations on individual enlistment behavior. It recounts the effect on an individual's enlistment probability of variables such as the Armed Forces Qualification Test (AFQT) score, family income, hourly wage, and employment status, and examines their differential impact on those expecting or not expecting further education. Section IV discusses how well these factors in combination predict individual

[3]The selection of individuals on the basis of a choice which they have made (e.g., enlist or not enlist) is called choice-based sampling, and with proper statistical methods, unbiased results can be estimated from such a sample. Those methods use weights based on the population and sample enlistment rates to correct for the oversampling of enlistees (see Hosek and Peterson [1985] for details regarding methodology).

enlistment behavior. Section V considers some implications of our findings for recruiting policy and strategy. Section VI considers implications for the design of aggregate data models for analyzing and forecasting enlistments and also for the expanded use of microlevel enlistment models.

II. MAJOR SEGMENTS OF THE RECRUITING MARKET

During high school, young men begin to consider seriously various career paths: how much education to obtain, whether it will be affordable, and which jobs might provide helpful (i.e., career applicable) experience. These considerations lead to decisions about whether and when to continue schooling, to enter the civilian workforce, or to enlist. Moreover, such decisions place the young men into distinct segments of the recruiting market. Young men in different segments typically have different aspirations, opportunities, and abilities. As a result, they will choose to enlist for different reasons and under different conditions, and recruiters may need to approach them with different strategies.

To illustrate how the composition of the recruiting market varies across its segments, we begin by dividing a cross section of nonenlisted male youth, ages 17–22, along two dimensions: student status and years of school. For seniors, "years of school" is 12; for graduates, "years of school" is years of school completed. Table 1 shows the results for spring 1979, the time our data were collected. The table shows, for example, that 4.1 million young men have 12 years of schooling, with 1.6 million in the student segment and 2.6 million in the nonstudent segment.

Our analysis focuses on the segments of the recruiting market that supply the bulk of young men entering active duty service with a high

Table 1

SIZE OF RECRUITING MARKET SEGMENTS, THOUSANDS OF MALES AGE 17–22, SPRING 1979

	Years of School			
Student Status	<12	12	>12	All
Student	1,099	1,551	2,360	5,010
Nonstudent	1,566	2,574	423	4,563
Total	2,665	4,125	2,783	9,573

SOURCE: 1979 wave of National Longitudinal Survey of Youth.

school diploma or who have high AFQT scores. These segments are the high school seniors and the nonstudent high school graduates; we refer to them briefly as *seniors* and *graduates*. The graduate segment includes nonstudents who have completed 12 or more years of school. Of these, 13 percent have finished one or more years of postsecondary education. In 1984, an outstanding recruiting year, 93 percent of the nonprior service (NPS) young men entering active duty had graduated from high school; in 1979, an especially difficult recruiting year, the figure was over 70 percent.

Given youth decisionmaking about school, work, and enlistment, we should expect the cells of Table 1 to contain selected (nonrandom) subpopulations of youth. For instance, college students were seniors who chose to continue their education rather than enter the civilian labor market or enlist. Nonstudent high school graduates were seniors who chose to discontinue, or at least to interrupt, their education and to enter the labor market full time rather than enlist. High school seniors, when sophomores and juniors, decided to finish high school rather than drop out.

To indicate how these decisions affect the composition of youth in the cells of Table 1 we use two variables: the percentage of young men scoring in the upper half of the AFQT ability continuum (i.e., AFQT Categories I-IIIA) and the percentage who expect to obtain more education. Upper-AFQT high school graduates are desirable recruits because, with their higher aptitude, they are more readily trainable and, being high school graduates, are expected to have lower first-term attrition rates.[1] The distinction between youth who do and do not expect more education is important because this characteristic weighs heavily in the decisionmaking of young men as they choose between further schooling, full-time civilian work, and enlistment. Our findings indicate that an individual's educational expectations interact with the effects of many other determinants of the probability of enlistment.

The upper and lower panels of Table 2 show the percentages of male youth in the upper-AFQT group and those expecting more education, respectively. These percentages vary widely across the cells of the table. Only 15 percent of the high school dropouts are high scorers on the AFQT, versus 53 percent of the seniors and 83 percent of the postsecondary students. By comparison, 66 percent of the dropouts expect more education, versus 63 percent of the seniors and 90 percent of the postsecondary students. Also, the senior and graduate segments are about equally rich in numbers of upper-AFQT youth. However, the

[1]Attrition rates based on military personnel records show that the first-term attrition rate among nonhigh school graduates is twice that of graduates.

percent of seniors who expect more education is far higher than that of nonstudent graduates with 12 years (63 versus 40 percent).

The market segments we have discussed are not merely descriptive—they provide functional insight into the enlistment decisions of youth. Table 3 compares the enlistment performance of the senior and graduate segments in 1979. We show the enlistment rate of segments overall and also of both the upper-AFQT and the expect-more-education groups.

The selective nature of the senior and graduate populations leads to differences in their enlistment behavior. The last column of Table 3 shows that graduates as a whole had an enlistment rate about a third higher than that of seniors, whereas high-AFQT graduates had an enlistment rate about 50 percent higher than their senior counterparts. The enlistment rate of seniors expecting more education was below that of seniors not expecting more education, but, interestingly, the reverse pattern holds among graduates.[2] Results from our detailed

Table 2

RECRUITING MARKET SEGMENTS OF MALES AGE 17–22 IN THE UPPER-AFQT AND EXPECTING-MORE-EDUCATION GROUPS, BY YEARS OF SCHOOL AND STUDENT STATUS, SPRING 1979
(Percent)

	Years of School			
Student Status	<12	12	>12	All
Upper-AFQT				
Student	34	53	83	63
Nonstudent	15	49	67	39
Total	23	51	81	52
Expect More Education				
Student	96	63	90	83
Nonstudent	66	40	55	54
Total	78	53	85	69

SOURCE: 1979 wave of National Longitudinal Survey of Youth.

[2]Comparing civilian and military male samples from the 1979 NLS, Fredland and Little found that the educational aspirations of first-term enlisted males age 18–22 were higher than those of their civilian counterparts. Our results suggest that this finding is attributable to market segmentation. The higher enlistment rate among graduates who expect more education, and the fact that graduates are a more populous segment, appear responsible for the higher proportion of individuals expecting more education within the

Table 3

1979 ENLISTMENT PERFORMANCE OF THE SENIOR AND GRADUATE MARKETS

Market	Size	FY1979 Enlistments	Enlistment Rate
Overall			
Seniors	1,551,000	61,000	3.9
Graduates	2,997,000	159,000	5.3
AFQT Category I-IIIA			
Seniors	823,000	27,000	3.3
Graduates	1,550,000	79,000	5.1
Expect More Education			
Yes			
Seniors	976,000	29,000	3.0
Graduates	1,211,000	99,000	8.2
No			
Seniors	575,000	32,000	5.6
Graduates	1,786,000	59,000	3.3

SOURCES: 1979 wave of National Longitudinal Survey of Youth and the Defense Manpower Data Center.

empirical analysis, described in the next section, provide further insight into the differences in enlistment behavior between the two segments and the influence of selectivity on those differences.

Our analysis does not focus on subsets of the male youth population that have revealed a preference to enlist. Such subsets include applicants, persons who have made contact with recruiters and taken the Armed Services Vocational Aptitude Battery (ASVAB). Enlistment rates for seniors and graduates overall are, of course, lower than for the subsets who reveal themselves to be interested in enlisting. For example, while only about 4.8 percent of the seniors and graduates enlisted in 1979, about 50 percent of the 1979 applicants subsequently enlisted over the next few years. However, current research indicates that a

military than in the civilian sector. See Eric J. Fredland and Roger D. Little, "Educational Levels, Aspirations, and Expectations of Military and Civilian Males, Ages 18–22," *Armed Forces & Society*, Vol. 10, No. 2, Winter 1984, pp. 211–228.

similar set of factors influences enlistment behavior among both applicants and the youth population at large.[3] As a result, our analysis will be useful to recruiters as they seek prospects among that population and as they pursue the prospects who appear more likely to enlist.

[3]Studies in progress at Rand by Bruce Orvis and Martin Gahart on the 1983 applicant survey, and by Richard Buddin and Donald Waldman on the 1981 NLS-Applicant-Enlistee choice-based sample.

III. WHO ENLISTS, AND WHY

Many factors influence a young man's enlistment into the military, and the effect of each factor may differ across recruiting market segments. In our analysis, we found substantial differences in factors affecting the enlistment behavior of seniors and graduates. Within these segments we also found differences between the upper- and lower-AFQT subsegments and especially between the subsegments defined by positive and negative expectations for further education. Considered with the senior/graduate distinction, differences in education expectations provide a simple yet powerful way of organizing knowledge about male enlistment behavior. Other groups, such as the upper-AFQT segment, can in fact be understood as composites of seniors and graduates who do or do not expect more education. For these reasons, we organize our discussion here around findings concerning seniors and graduates by education expectations.

In this section, we examine a variety of variables in four general categories:

1. Learning proficiency
2. Ability to finance further education after high school
3. Parental influence on educational expectations
4. Employment situation

Most of these variables can be readily determined by recruiters in conversations with recruiting prospects.

We find overall that graduates are more affected than seniors by work-related variables, such as employment status, wage rate, weekly hours of work, labor force experience, job tenure, and (if not employed) duration of joblessness. Generally speaking, the more success a graduate finds in the civilian labor market, the less likely he is to leave it and enlist. Seniors as a whole are more responsive than graduates to education-related factors such as learning proficiency, ability to finance further education, and parental influence. However, employment-related factors are important for many seniors, just as education-related factors influence many graduates.[1]

[1]Sample sizes for our segments are 1784 seniors (1336 enlistees, 448 nonenlistees) and 2187 graduates (1419 enlistees, 768 nonenlistees).

1. Learning proficiency

AFQT score is the chief measure of learning proficiency in our data; one's age when a senior is a secondary measure. Both measures are easy for recruiters to determine. The AFQT score, based on tests of verbal and quantitative skills, is a straightforward measure of academic ability and is known to predict training success in the military. Age when a senior is less obvious, but the basic idea is that younger seniors have more learning proficiency than older seniors.[2] They will have completed high school in less time, and they typically have higher AFQT scores. In our sample, 17-year-old seniors averaged the 58th percentile, 18-year-old seniors the 54th, and 19-year-old seniors only the 29th.

Figure 1 depicts the relationship between the probability of enlistment and the AFQT score. This probability, like those in the following figures, is predicted from our regression results and holds all other variables (age, wage, etc.) constant at levels representative for the subsegment. (See Appendixes A and B.) Also, the AFQT score is allowed to range between 40 and 100, its maximum. Individuals with scores below 40 were frequently demand-constrained; that is, their low scores made them ineligible for military service or for training in certain skills.

The higher a senior scores on the AFQT, the less likely he is to enlist. This is readily seen in the upper panel of Fig. 1 for seniors who do not expect more education. For these individuals, apparently, higher learning proficiency translates into better civilian job opportunities, or at least higher expectations about those opportunities. Thus, their propensity to enter the civilian labor market rises and their propensity to enlist falls. Among seniors who do expect more education, the propensity to enlist is already uniformly low, so that a high AFQT score does little further to reduce it.

The story for graduates is more complicated. Among graduates who expect more education, enlistment probability actually increases with AFQT score. These individuals seemingly view the military as the quickest way to achieve their educational goals, either by obtaining military training or taking advantage of educational benefits offered by the Services. The fact that these individuals did not enlist during their senior year may reflect several phenomena: they may have thought their employment opportunities were better than they turned out to be; they may have underestimated the importance of further training and education; or they may have overestimated their ability to earn enough money to finance further schooling.

[2]For seniors, age when a senior is age in spring of 1979; for graduates, age when a senior is age when graduated from high school.

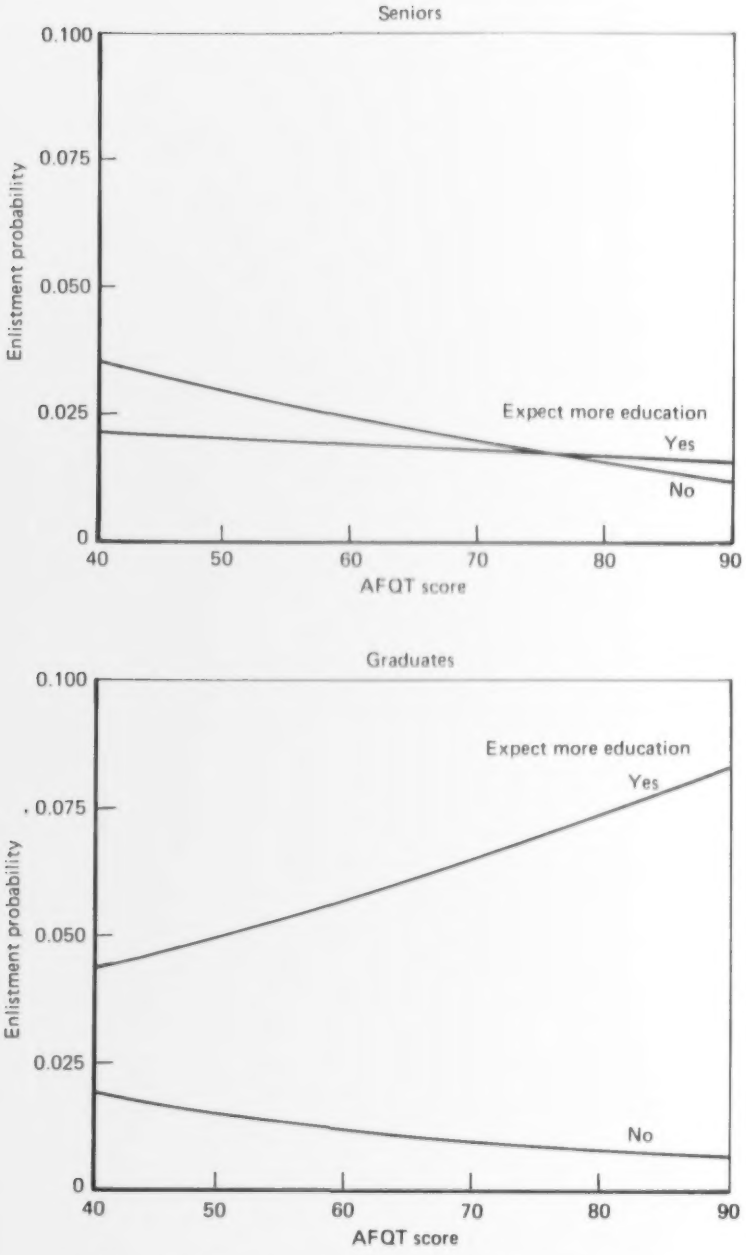

Fig. 1—Enlistment probability by AFQT score for seniors (top panel) and graduates (bottom) with differing educational expectations

By contrast, among graduates who do not expect more education, enlistment probability decreases as AFQT rises. Among these individuals, as among seniors who expect no further education, higher learning proficiency may translate into more success in the civilian labor market. As a result, their propensity to enlist falls.

With respect to age when a senior, we find that older seniors are more likely to enlist than younger, and that this relationship holds for both educational expectations groups. Among graduates, an individual's age when a senior is not significantly related to enlistment probability.

2. Ability to finance education beyond high school

We have two measures of a young man's ability to finance postsecondary education: family income and family size (number of siblings). As the upper panel of Fig. 2 shows, if a senior expects more education, then the higher his family income, the less likely he is to enlist (and the more likely, presumably, he is to enroll immediately in college). For seniors who do not expect more education, family income has virtually no effect on the probability of enlistment. For graduates (lower panel of Fig. 2), family income has no effect on enlistment probability, regardless of educational expectations. This is surprising, given that 71 percent of the graduates still live with their parents or guardians. In particular, the absence of a family income effect even among the graduates who expect more education suggests that, although they may not have left home physically, they tend to be financially independent of their families. If so, these graduates may be especially responsive to educational benefits offered by the Services.

As family size increases (holding income constant), seniors overall become more likely to enlist. However, this effect is concentrated among seniors who expect more education. For them, the role of family size parallels the role of family income: young men from larger families generally have less financial ability to pursue higher education, so are more likely to seek training in the service as an alternative. On the other hand, family size has no appreciable effect on seniors who do not expect more education.

We also find that graduates, particularly those who do not expect more education, are more likely to enlist the larger their families. One possible explanation for this result is that the families of such young men may not be able to offer them much support toward pursuing a career in the civilian labor market. Indeed, these families may be expecting support from their sons. The military offers not only an opportunity for training and advancement within a career, but also a steady income, a portion of which could be transferred to one's family.

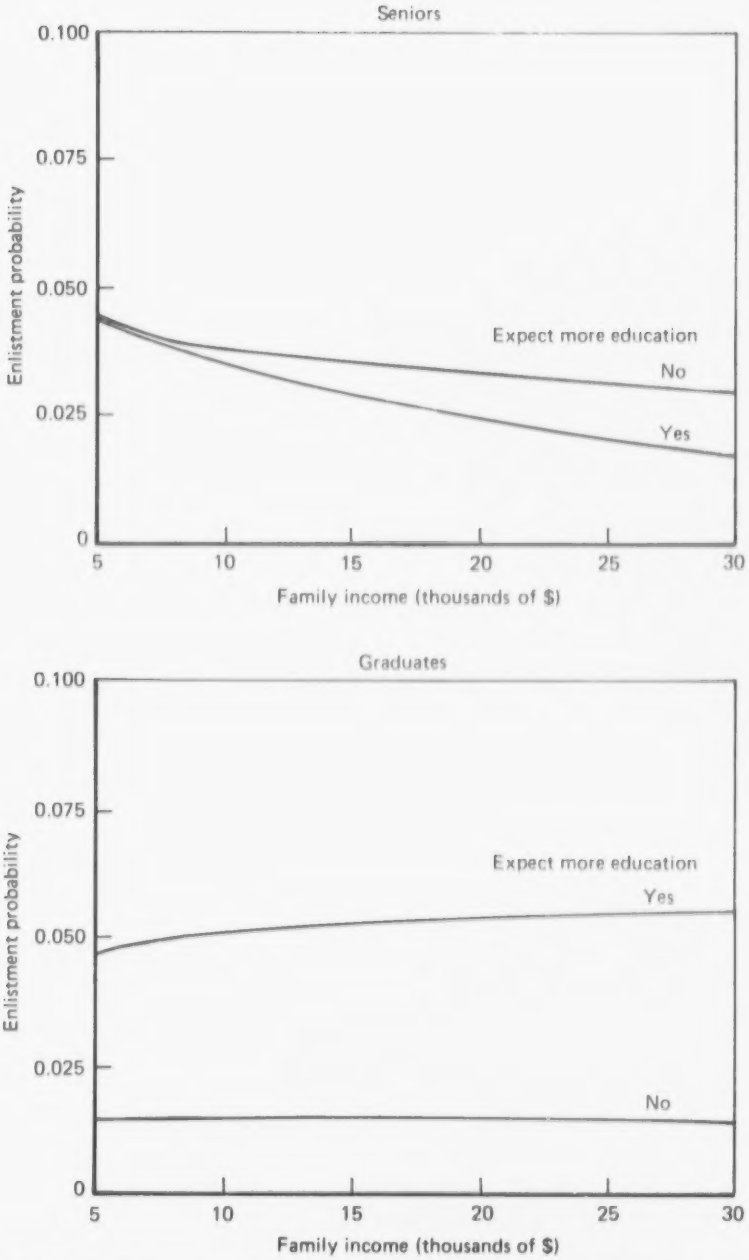

Fig. 2—Enlistment probability by family income for seniors (top panel) and graduates (bottom) with differing educational expectations

3. Parental influence and educational expectations

Our study included only one measure of possible parental influence on the individual's enlistment probability: the mother's educational attainment is used as a measure of parental concern for further education. (There is a positive correlation between the educational attainment of the mother and father.) The recruiter may be able to obtain such information when talking to a prospect, but as with family income, this may be a sensitive question to ask. It may be easier for the recruiter simply to discuss whether a prospect's parents are concerned about his obtaining further education.

For both seniors and graduates, the effect of mother's education differs according to the individual's own educational expectations (Fig. 3). Among seniors or graduates who expect more education, mother's education has no effect on enlistment probability. However, among seniors or graduates who do not expect more education, enlistment probability rises with mother's education.

This pattern suggests that households with more educated parents place greater emphasis on further education or training beyond high school. This emphasis is redundant if the son already expects to obtain more education. But if he does not, his parents may view the military (relative to a civilian job) as an attractive substitute to formal schooling, and all the more so as their education rises.

4. Employment situation

We analyzed many aspects of an individual's employment situation, including:

- Hourly wage
- Weekly hours of work
- Months at current job
- Months since school (graduate segment only)
- Employment status and months since last job

Information on each of these aspects can be readily determined by the recruiter.

Generally, the more success and satisfaction an individual finds or can expect to find in the civilian labor market, the less likely he is to enlist. The more economic duress he suffers or expects, the more likely he is to enlist.

Hourly wage. Figure 4 displays the relationships between hourly wage and enlistment probability for seniors and graduates grouped by

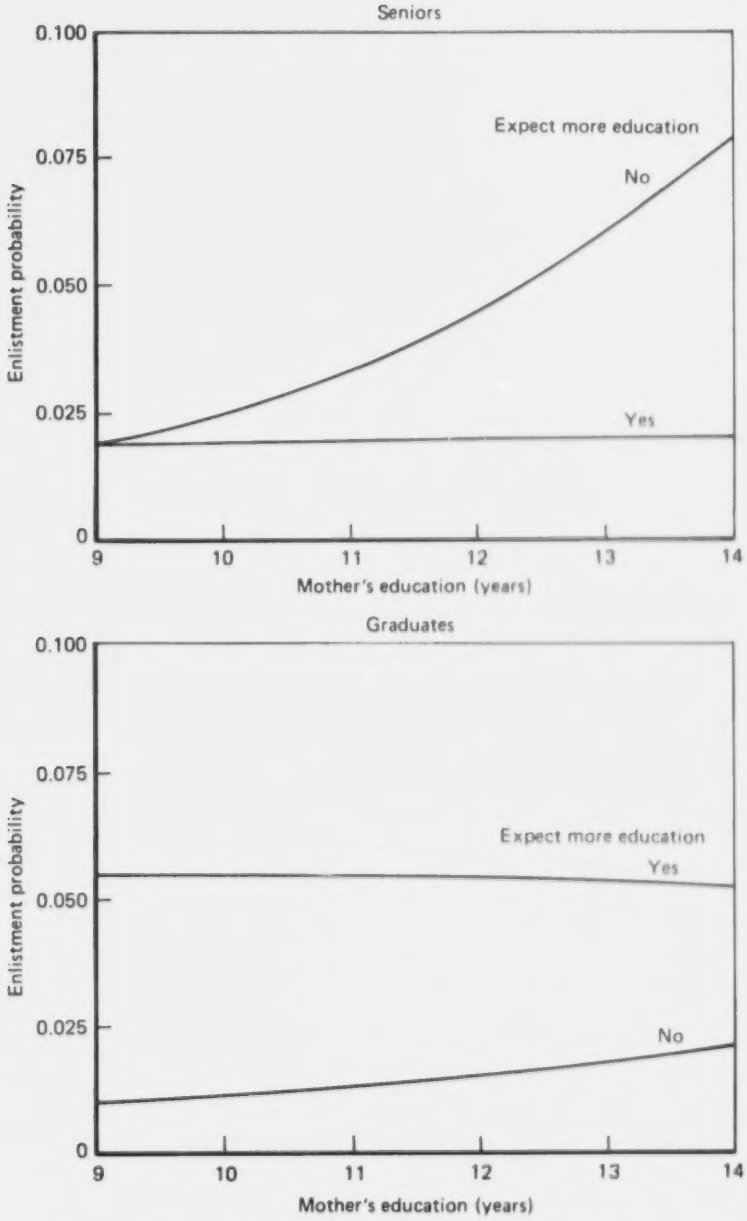

Fig. 3—Enlistment probability by mother's education for seniors (top panel) and graduates (bottom) with differing educational expectations

their educational expectations. Overall, seniors and graduates are less likely to enlist the higher their wage rate, as one would expect. This sensitivity for seniors as well as graduates underscores the growing importance of employment among seniors. In spring 1979, a time of low national unemployment, 60 percent of the seniors were employed, and another 28 percent had been employed within the previous 12 months. By comparison, 88 percent of the graduates were employed and another 9.6 percent had been employed within the past year.

We find that the effect of wage rate on enlistment probability depends on educational expectations. For both seniors and graduates, those who expect more education are less affected by wage change than those who do not expect more education. Among those who expect more education, the current job seems more likely to be casual or temporary, so that its wage is a less important factor in the enlistment decision.

Wage responsiveness is frequently characterized by an elasticity, or the effect of a 1 percent increase in the hourly wage on the *percentage* change in the enlistment probability. Elasticity values can vary among individuals depending on their characteristics; however, for the "representative" seniors and graduates underlying the figures, the elasticities are as follow. For seniors and graduates who expect more education, the wage elasticities are $-.65$ and $-.59$, respectively. That is, a 1 percent increase in the hourly wage reduces the enlistment probability by just over half a percent. The elasticities for seniors and graduates who do not expect more education are much larger: -3.3 and -1.1, respectively.

How do these values compare with other military enlistment studies? Most authors have used aggregate data and have concentrated on "high quality" males—high school seniors and graduates scoring in the upper half of the AFQT distribution. Elasticity estimates from these studies frequently lie in the range from $-.5$ to -1.0, although lower or higher estimates are not uncommon, depending on the data and method employed. For comparison, we calculated an overall elasticity using wage elasticities for the upper-AFQT senior and graduate segments broken down by educational expectations. This resulted in an elasticity of -1.45, which is somewhat higher than the usual range found in aggregate data. Of course, this composite value masks the sharply differing behavior across market segments which our microdata have allowed us to uncover and which has remained unseen in aggregate data analyses.

Weekly hours of work. Together with wages, weekly hours of work provides a useful measure of an individual's earning power. For

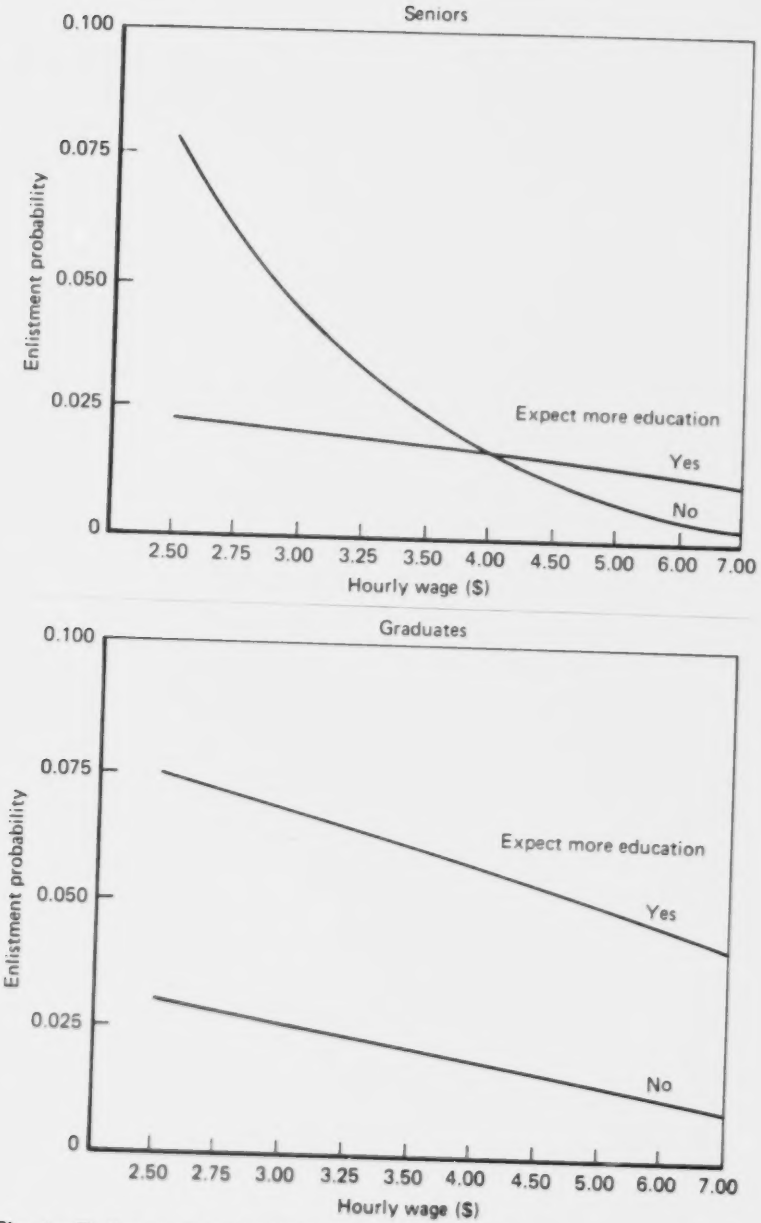

Fig. 4—Enlistment probability by hourly wage for seniors (top panel) and graduates (bottom) with differing educational expectations
(Based on regression results using the natural logarithm of hourly wage)

individuals not currently employed, hours of work on the last job indicates their loss of earnings and may measure their economic duress.

Among seniors, the effect of weekly hours depends on the individual's expectation for further education. If a senior expects more education, the more hours per week he works or worked on his last job (if he is not currently working), the more likely he is to enlist. For seniors who expect more education, a willingness to work relatively long hours during the senior year may signal a need for money to finance further education, in which case the educational benefits and training offered by the military may be particularly attractive. In contrast, if a senior does not expect more education, the number of hours he works per week says little about his propensity to enlist.

Among graduates, the effect of weekly hours depends on the individual's current employment status. For employed graduates, weekly hours has a mild negative effect on enlistment probability. But the effect reverses for unemployed graduates: weekly hours on the last job is positively related to enlistment probability. If a graduate is not currently working, the longer hours he has worked at his last job, the more earnings loss he has suffered, and this mounting loss is an inducement to enlist. These relationships hold regardless of whether the graduates expect more education.

Months at current job. The longer an individual works at a specific job, the less likely he is to leave it and enlist. This effect holds for both seniors and graduates and for both educational expectations subsegments.

Months since school (graduate segment only). The longer a graduate has been out of school (whether high school or a postsecondary institution), the less likely he is to enlist. This is true of graduates in both subsegments. However, the effect is about twice as great among graduates who do not expect more education as among those who do.

These effects imply that the population of graduates becomes more selected over time. Those with stronger propensities for further schooling or for enlistment depart, leaving in the graduate segment those with stronger propensities for civilian jobs. This selection process makes it more difficult to recruit older graduates than younger ones.

Employment status and months since last job.[3] Among both

[3]In addition to the individual's employment status and duration of joblesaness, the analysis tried variables to control for employment conditions in the surrounding economy in the form of the state unemployment rate and the cyclical component of a state's variation in employment. These state-level variables were typically unimportant in explaining the individual's enlistment probability. State-level information was the only adequate data available to us at the time. More disaggregated employment data, such as at a

seniors and graduates, the longer that individuals are unemployed, the more likely they are to enlist. This positive effect is much stronger among seniors who do not expect more education than among those who do, whereas it holds for graduates regardless of their educational expectations.

Figure 5 shows the relationships between enlistment probability and months since last job for seniors and graduates by educational expectations. The curve for seniors who are not employed starts at a low enlistment probability. This presumably indicates that for them joblessness may not be a symptom of duress; rather, they may be concentrating on their studies. In fact, over nearly the entire six-month range of months not employed (shown in Fig. 5), their enlistment probability is lower than that of seniors who are employed. Nevertheless, the longer since being employed, the more likely seniors are to enlist. However, this effect is weak among seniors who expect more education and much stronger for those who do not. For the latter group, joblessness appears to become an increasingly important factor in the enlistment decision.

The relationship between enlistment probability and months since last job is also strong for graduates. Enlistment probability rises by a factor of three as months since last job range from one month to six months. Moreover, even at one month of joblessness, the unemployed graduates are typically more likely to enlist than employed graduates.

The attractiveness of the military for those with poor civilian job histories, as evidenced by longer periods of joblessness and/or low wages, can be viewed as a reevaluation by the individual of his labor market (military and civilian) potential. The individual may first have chosen to pursue civilian labor market opportunities. However, as joblessness continues and an acceptable job has not been found, he may reassess his options, and the military may now become the most desirable choice.

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county level, may better capture how the local economy affects the individual's probability of enlistment.

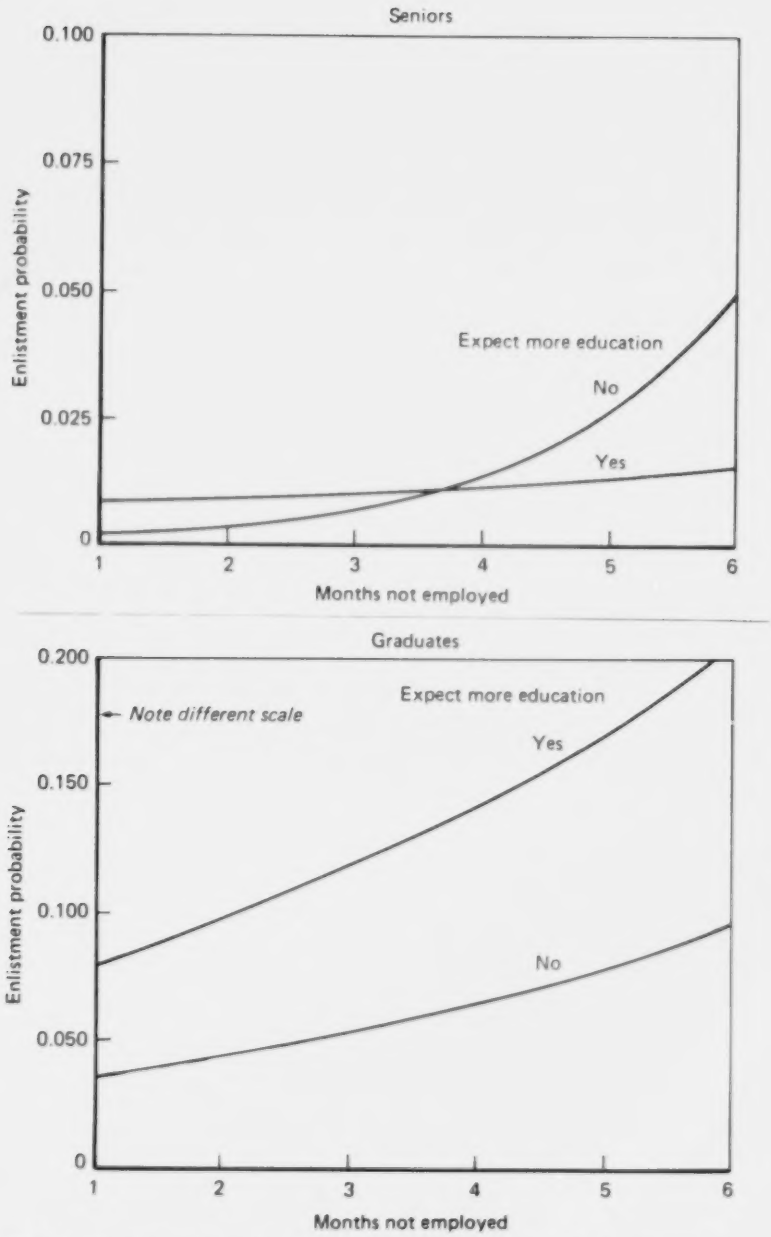

Fig. 5—Enlistment probability by months since last job for seniors (top panel) and graduates (bottom) with differing educational expectations

IV. EVALUATING ENLISTMENT PROSPECTS

Recruiters do not face a homogeneous market of young men—the effects of factors influencing the individual's enlistment probability vary across groups of individuals. These differences in enlistment behavior help establish distinct segments of the recruiting market, segments which the recruiter may have to work in different ways. Because the recruiter's actions will vary across these different groups of individuals, he is faced with the problem of allocating his time and effort across market segments.[1]

To allocate their time and effort effectively, recruiters must be able to size up enlistment prospects. This assessment requires an awareness of the reasons why individuals in different segments of the market choose to enlist. For example, recruiters at the outset of their tours may not be aware that although seniors expecting more education are less likely to enlist, graduates expecting more education are more likely to enlist. Similarly, a recruiter might not know that seniors from higher income families have lower enlistment probabilities unless they happen to come from a large family; or that a graduate's enlistment probability is unrelated to family income; or that wage and employment sensitivity differ considerably by market segment and subgroup.

Of course, the capability to distinguish more-likely from less-likely enlistment prospects has little practical utility unless the enlistment probabilities of the two groups differ substantially. In fact, our empirical estimates reveal a wide variation. To illustrate this, we predict the enlistment probability for each senior and graduate, given the values of his explanatory variables, and then array the predicted probabilities into deciles. Figure 6 presents the results for seniors and graduates by educational expectations. It shows, for instance, that seniors in the 8th decile[2] are, on average, several times more likely to enlist than seniors in the 2nd decile. The graduate distributions, too, display a wide variation in enlistment probability by decile. Seniors who expect more education are typically less likely to enlist—that is, have a lower predicted enlistment probability—than seniors who do not expect more educa-

[1]See James Dertouzos, *Recruiter Incentives and Enlistment Supply*, The Rand Corporation, R-3065-MIL, May 1985.

[2]Ten percent of our population falls within each decile. An individual in the 8th decile has an enlistment probability in the 71st to 80th percentile range of the probability distribution. The predicted probability in the 8th percentile shown in Fig. 6 is the average predicted enlistment probability of those whose individual predicted enlistment probability fell within the 71st to 80th percentiles.

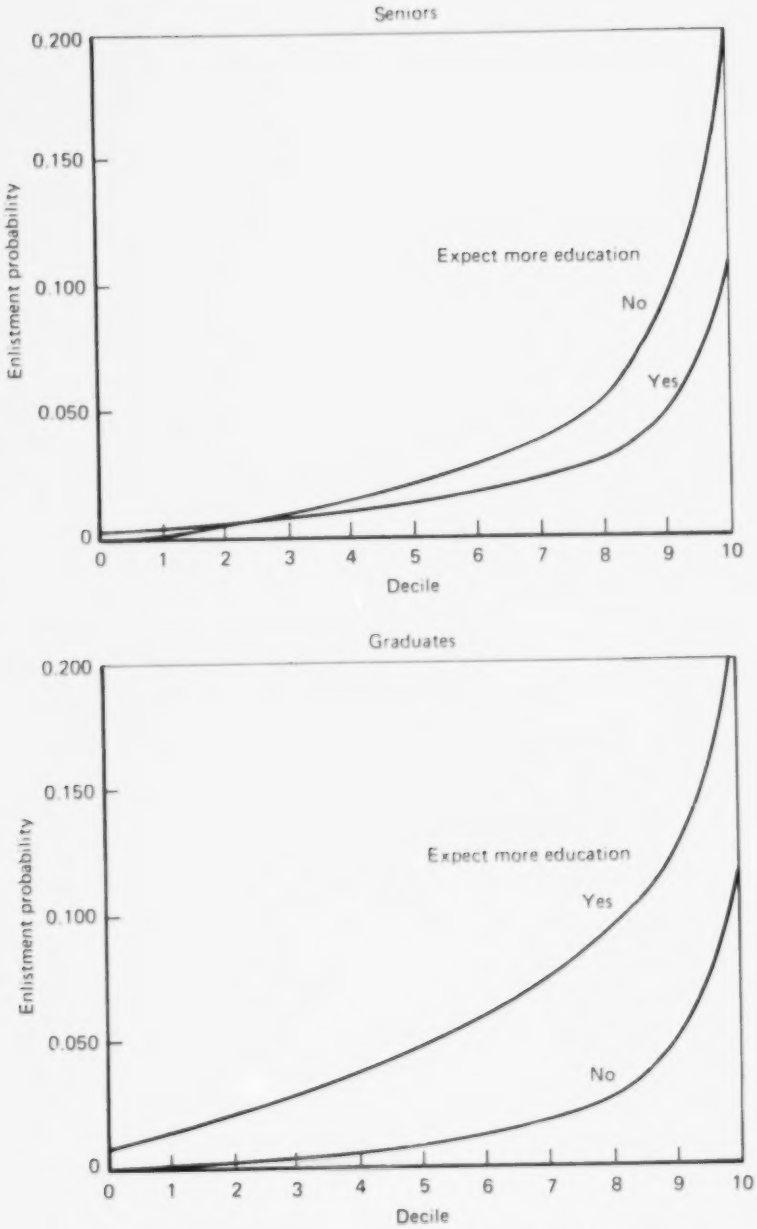

Fig. 6—Enlistment probability by decile for seniors (top panel) and graduates (bottom) with differing educational expectations

tion. The graduate distribution also exhibits a divergence between the educational expectations groups, reversing the pattern for seniors. For instance, graduates in the 5th decile are about twice as likely to enlist if they expect more education than if they do not. This, of course, is in keeping with our discussion in Sec. III.

Thus, our findings offer ample opportunity for discerning large relative differences in the enlistment probabilities of young men with diverse characteristics. The absolute range of predicted enlistment probabilities of course remains low. As Fig. 6 shows, nearly 90 percent of the seniors and graduates have predicted probabilities of enlistment of less than 10 percent. This should not be surprising since in 1979 only 3.9 percent of the senior population and 5.3 percent of the graduate population (age 17–22) enlisted.

Individuals with similar enlistment probabilities can have widely varying profiles; that is, many combinations of personal characteristics and conditions can yield roughly the same probability of enlistment. In addition, two individuals with the same enlistment probability but from different market segments may not have the same relative likelihood to enlist within their respective segments. To illustrate this point, Table 4 profiles four individuals who all have a predicted enlistment probability of .03. Note, however, that although their predicted enlistment probabilities are the same, they do not all fall into the same portion of the enlistment probability distribution within their respective market segments. The first senior has only an average likelihood of enlisting compared with other seniors who do not expect more education (6th decile), whereas the second senior is highly likely to enlist compared with seniors expecting more education (8th decile). Although the first graduate is also relatively more likely to enlist among those not expecting more education, the second graduate with the same enlistment probability is unlikely to enlist relative to other graduates who expect more education.

For a given level of recruiting effort, a recruiter wishes to maximize the expected number of recruits. To do this, he can use information about the differences between and within the market segments making up his area. Using the example above, the recruiter might work the graduate expect-more-education market more heavily since 70 percent of the males in that subsegment have higher enlistment probabilities than the graduate with a .03 probability. In turn, the recruiter might reduce or limit efforts within the other graduate market.

However, the recruiter's willingness to do this will also depend on the additional effort required to work the graduate segment more intensively. Graduates may be more difficult to contact. What the recruiter finally decides about allocating his effort among the various

Table 4

FOUR INDIVIDUALS WITH THE SAME ENLISTMENT PROBABILITY

Characteristic	1	2	3	4
Segment	Senior	Senior	Graduate	Graduate
Expect more education	No	Yes	No	Yes
Age	18	17	19	20
AFQT	86	78	56	59
Family income	$29000	$19500	$16900	$23400
Employed	Yes	Yes	Yes	Yes
Wage rate	$3.25	$2.65	$3.89	$6.00
Hours of work	20	18	40	40
Enlistment probability	.03	.03	.03	.03
Decile	6th	8th	8th	3rd

market segments will depend not only on the enlistment probabilities of the possible prospects, but also on the incremental effort required to contact and recruit the prospects. Our findings do not quantify the incremental effort, but they do afford information about an individual's willingness to enlist, given his market segment and background characteristics (Table 4).

V. IMPLICATIONS FOR RECRUITING

In this section, we relate our findings to three topics:

- Recruiting from the male youth population
- The effect on enlistments caused by changes in the wage for civilian males
- Why male recruits have lower than average family income

Although our analysis was not designed specifically to address these topics, our findings have bearing on each of them.

RECRUITING FROM THE MALE YOUTH POPULATION

One of our main findings is that the enlistment behavior of young men differs substantially between the senior and graduate market segments, and within these segments by educational expectations. Further, even within subsegments, simple stereotypes of recruits may not be helpful to recruiters. Rather, at the *individual* level the probability of enlistment is affected by a confluence of factors ranging from family background to educational aspirations to employment situation. We have shown that the combination of these factors contributes to an accurate assessment of an individual's likelihood of enlistment; none of the factors is superfluous. These factors are supply-side characteristics and are affected little, if at all, by the recruiter or by enlistment incentives and advertising. This does not mean that people with different characteristics will be unresponsive to recruiters, incentives, or advertising, but that their propensity to enlist may differ for reasons beyond the control of recruiting policy.

Recruiters may be able to capitalize on our findings by being better able to gauge the likely payoff from different segments of local recruiting markets and from the pool of prospects they are working. For example, recruiters should be aware that areas with a large proportion of seniors who want to go to college may have either a low or a high recruiting potential, depending on other factors such as family income and local employment conditions. Even with good employment conditions, an area with lower family incomes may be relatively rich in graduates who expect more education, a group we have found to have high enlistment probabilities.

When among seniors, recruiters should pay special attention to an individual's plans for further education, ability to finance further education, and intellectual ability. Seniors who expect more education are more likely to enlist the lower their family income, the larger their family size, and the greater their work experience (including current employment). Seniors who do not expect more education are particularly concerned about their opportunities in the civilian labor market; this is the most wage-sensitive group we found.

There is little doubt that high schools will remain the wellspring of future recruits, even though the graduate segment, because of its greater size, supplies more high school diplomates to the military than does the senior segment. (We estimate 159,000 graduate enlistments in 1979 versus 61,000 senior enlistments; the graduate segment of the recruiting market was twice as large as the senior segment—see Table 3.) High schools offer recruiters access to a cross-section of youth. It is easier there than in the civilian labor market to contact qualified prospects and to create a portfolio of leads for future pursuit. The importance of such leads is clear from a tabulation based on our graduate enlistee data: 60 percent of the graduates had enlisted within a year after graduation, and another 20 percent did so within the second year after graduation.

But who among the graduates are the best targets for recruiting efforts? Our findings confirm that *recent* graduates are more likely to enlist than those who have been in the civilian labor market for several years. The latter have apparently met with success finding a job, or at least a career path, they can settle into. A second factor is educational expectations. Graduates who expect more education are more likely to enlist, and this effect is stronger the higher their AFQT. Graduates who do not expect more education are less likely to enlist. But among these graduates, we find that enlistment probability is higher the higher the mother's education. High-wage graduates are less likely to enlist, but the negative effect of high wages is stronger among graduates who do not expect more education. Their wage elasticity is *twice* that of graduates who expect more education.

These findings lead to another point: *older* graduates may not be a good target for expanded recruiting effort. There are several reasons why: the young men with higher enlistment propensities already enlisted when they were seniors or recent graduates, thus the average enlistment propensity among older graduates is quite low; the older graduates tend to have higher wage rates and more job tenure, factors which again diminish the group's average enlistment propensity; and the older graduates most likely to enlist include persons who have had difficulty holding a job and who may be currently unemployed, making

them high risks for early attrition in the military. Buddin has found that, even among high school graduates, attrition in the first six months of service is much higher for older males (age 20–22) with a history of job turnover and unemployment than for younger men with less job turbulence.[1]

In assessing the relative ease, or difficulty, of recruiting from the senior versus graduate markets, our analysis suggests several factors to keep in mind in addition to those already mentioned. First, the difficulty of recruiting graduates will be affected by the enlistment rates of their cohorts in previous years. For instance, if relatively many enlisted during their senior year, then the enlistment rate of the cohort in subsequent years will tend to be lower. A high enlistment rate in a given year might be caused by relatively high military pay, high enlistment incentives, low civilian pay, poor civilian employment opportunities, or low financial aid from postsecondary institutions, particularly two-year colleges. This cohort-depletion phenomenon has not been accounted for in aggregate data models of enlistment.

Second, depletion aside, the enlistment propensities of seniors relative to graduates will change over the business cycle. The change occurs because seniors respond differently to changes in the hourly wage and unemployment. An across-the-board decline in civilian youth wages will cause the greatest percentage increase in enlistments among seniors who do not expect more education, followed by graduates who do not expect more education, and then by seniors and graduates who do expect more education. An increase in the youth unemployment rate will probably have its greatest and most immediate effect among graduates, regardless of their educational expectations. The effect among seniors will be more subtle: fewer seniors will be able to work, and whether they were working as a prelude to full-time participation in the civilian labor force or to save money for college, they will perceive enlistment in the military to be a better opportunity than before.

Finally, our findings imply that a recruiter's interest in working the graduate segment depends on his incentives to do so. We mentioned that it is more difficult for recruiters to make contacts and pursue leads among graduates. Unlike high schools, the labor market is decentralized, and employers have little reason to encourage visits by recruiters. One of our results indicates that when seniors and recent graduates (less than one year out of high school) are abundant, the relative difficulty of recruiting graduates may result in recruiters underworking the graduate market. The extent of underworking

[1]See Richard Buddin, *Analysis of Early Military Attrition Behavior*, The Rand Corporation, R-3069-MIL, July 1984.

depends, most likely, on the degree to which the recruiter can satisfy his enlistment goal with seniors.

We found that as the proportion of seniors and recent graduates in a local recruiting market increased, the likelihood that a graduate would enlist decreased. (Here "local recruiting market" means a Military Entrance Processing Station, or MEPS, area.) The number of recruiters relative to the size of the local male youth population could be a factor, but in our data was not, since it did not vary significantly across markets. Rather, it appeared that the more seniors there were for recruiters to contact and pursue, the more senior recruits they could expect to obtain. Hence the less the need for graduates and, presumably, the fewer the graduates actually contacted and pursued.

Our results show that a 1 percent increase in the proportion of seniors and recent graduates led to a 3.7 percent decrease in a graduate's enlistment probability. (There was no effect on a senior's enlistment probability.) The effect was stronger for high-aptitude graduates: a 5.2 percent decline for the upper-AFQT graduate versus a 1.3 percent decline for the lower-AFQT graduate. The larger effect for high-aptitude graduates may imply that they are especially costly in terms of recruiter effort, which is consistent with the fact that they are more likely to be employed at a high-wage job than lower-AFQT graduates.

If recruiters had been encouraged to recruit more heavily from the graduate market in 1979, how many more high school graduates or upper-AFQT graduates might have enlisted? Such questions are difficult to answer because the variable indicating the proportion of seniors and recent graduates in the local labor market does not have a strict policy-variable counterpart. But if the recruiters' additional effort had been equivalent to decreasing the relative number of seniors and recent graduates in the MEPS area by 5 percent, then, for example, upper-AFQT graduate enlistment would have risen about 25 percent. Instead of the 79,000 upper-AFQT graduates enlisting in 1979, there would have been nearly 100,000.

Our finding does pertain to 1979. Since then recruiter management practices have changed, particularly in the Army, where recruiters now have explicit incentives to recruit from the graduate as well as the high school market. As the Army's recent experience (1981–85) has shown, if recruiters receive more credit for high-quality recruits they are more likely to increase their productivity of high-quality applicants. Indirectly, this also stimulates the recruitment of young men who are less likely to attrite because attrition is much lower among high school graduates than nongraduates. Still, the Services might review their current policies to see that recruiters devote optimal effort to the

graduate market in areas where seniors and recent graduates are comparatively numerous. Such policies should not necessarily reduce the effort to recruit seniors, but only ensure that the allocation of recruiters' effort is efficient across market segments.

EFFECT OF CHANGES IN CIVILIAN MALE YOUTH WAGES

We find that as an individual's civilian wage rate rises, he becomes less likely to enlist. As a result, when civilian wages rise relative to military pay, recruiting becomes more difficult. Several trends indicate that this will be the case through the coming decade. Two are well known: the recent economic recovery and Congressional action to hold down increases in military pay. The economic recovery which began in fiscal year 1984 has proceeded much more quickly than forecast, with the result that the ratio of military to civilian pay has declined. Further, many anticipate that Congress will cap military pay increases in the late 1980s at levels below increases in civilian wages.

The third trend is described in a recent study[2] which indicates that civilian wages will rise particularly fast among the young male youth population from which the services recruit. As the number of male youth decreases over the next ten years, the civilian wages of young men with little work experience will rise relative to the wages of more experienced workers. For example, by 1990 the wages of young men with one to two years of experience will have risen 3 percent more rapidly than the average wage rate of males in the labor force. This higher rate of increase is expected to continue until about 1995, when the male youth cohorts will again be increasing in size.

The projected decline in enlistment probabilities will vary across segments of the recruiting market. Unless offset by other factors, an increase in civilian youth wages relative to military pay will result in fewer recruits who are seniors, have high AFQT scores, or do not expect more education.

We estimate that if the civilian wage rate for seniors increased by 1 percent, their probability of enlistment would fall by .6 percent among seniors who expect more education and by 3.3 percent among those who do not. Among graduates, the declines would be .6 percent and 1.1 percent, respectively. Our estimates also imply declines for upper-

[2]See Hong W. Tan and Michael P. Ward, *Forecasting the Wages of Young Men: The Effects of Cohort Size*, The Rand Corporation, R-3115-ARMY, May 1985.

AFQT seniors and graduates of 3.3 and 1.1 percent. Other things equal, these responses mean that the coming relative increase in civilian pay will add more to the cost of recruiting seniors than graduates and, within these segments, add more to the cost of high-AFQT than low-AFQT individuals.

Educational benefits may help counteract the effects of the anticipated decline in relative military pay. Presumably these benefits will attract individuals who are interested in obtaining further education and who require financial assistance to do so. Since educational expectations are influenced by the ability to finance further education, an education benefits proagram may permit some individuals who had not expected further education to change their expectations. However, we cannot estimate whether the educational benefits will have an effect large enough to maintain the levels of upper-AFQT recruits in the face of a prospective decline in relative military pay. Our data did not permit us to study the effect of educational benefits directly.

WHY MALE RECRUITS HAVE LOWER THAN AVERAGE FAMILY INCOME

Our results provide new information about the representativeness of male recruits by family income. Fredland and Little,[3] who examine many dimensions of the social representativeness of active duty enlisted personnel in the first term of service, find that male enlistees have lower family incomes than do male nonenlistees. We add to their discussion by drawing inferences from our research about *why* this disparity occurs.[4]

The relevant findings from our analysis are the following:

- Young men from higher income families are more likely to expect more education. This pattern is particularly prevalent among seniors. The pattern is weaker among our graduate segment, which includes nonstudents only and, by construction,

[3]J. Eric Fredland and Roger D. Little, *Socioeconomic Characteristics of the All-Volunteer Force: Evidence from the National Longitudinal Survey, 1979*, U.S. Naval Academy, Annapolis, 1982.

[4]Keep in mind that we have not studied the enlistment behavior of nonhigh school graduates nor that of college students. Nevertheless, we have concentrated on the segments of the recruiting market, seniors and nonstudent high school graduates, which typically yield the majority of active duty enlistments. Also, the family income variable in our dataset exists only for the respondents who live at home. Our data indicate that 95 percent of the seniors and 71 percent of the graduates live at home. The percentage for graduates may seem high, but it is based on nonstudents. The percentage would be lower if it were based on all high school graduates, including those in college. Finally, the family income value is based on respondents' recall.

has been depleted of those high school graduates who went on to postsecondary education.

- Among seniors who expect more education (63 percent), an increase in family income reduces a senior's enlistment probability.
- Among seniors who do not expect more education (37 percent), an increase in family income has no apparent effect on the enlistment probability. (There is a small negative effect that is not statistically significant.)
- Among graduates, regardless of their educational expectations, family income is unrelated to enlistment probability.

From these findings we infer that the income disparity between enlistees and nonenlistees should be greatest among seniors who expect more education.[5] This arises because higher income families are not only likely to have sons with higher educational aspirations, but because these families can afford to send their sons to college. These young men tend not to enlist because they can and do choose college. By comparison, we expect the income disparity to be much less among the other three groups—the seniors who do not expect more education and the graduates who do, and do not, expect more education. Among these groups, the absence of a relationship between family income and enlistment probability means that the enlistment decision is largely *family income-neutral.* Family income appears not to have a direct role in graduates' decisions to enlist, and for seniors who do not expect more education, the role of family income, if present at all, appears minor.

Together, the inferences mean that the family income of enlistees is lower than that of nonenlistees largely because the young men from higher income families enter postsecondary education, not because the military per se draws young men from lower income families. After the college-bound are accounted for (via the subsegment of seniors who expect more education), the military draws fairly representatively from the remaining pool of youth, especially among the graduates.

It is relevant to add that the propensity to enlist is notably high among graduates who expect more education. Many of these graduates come from lower income families and could not afford postsecondary education on their own. The training and educational benefits offered

[5]Tabulations of average family income reflect these points. For instance, the average family income of white seniors expecting more education is nearly $8000 higher for nonenlistees than for enlistees. For those not expecting more education, the corresponding differential is about $3500, and among white graduates the differential is about $1000.

by the services thus may counteract the consequences of lower family income.

Of course, policies could be devised to encourage more higher income youth to enlist. The policies might include benefits or incentives that encourage them to serve in the armed forces before going to college. Special educational benefits and short terms of enlistment are possibilities (e.g., the Army's HIGRAD program and two-year enlistment option). These policies would in effect be aimed at the higher income seniors who expect more education. It seems likely that among such youth, those headed toward two-year colleges or vocational/technical schools would be more responsive to the policies. This view accords with the recent study by Fuller, Manski, and Wise,[6] who find that an individual's decision to enroll in a two-year or vocational/technical institution is very much affected by the availability and level of financial assistance. In contrast, the decision to enroll in a four-year institution is relatively unaffected by the availability of financial assistance. (However, the choice of *which* four-year institution may be affected, given the large differences in tuition and costs among the institutions.)

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[6]Winship C. Fuller, Charles F. Manski, and David A. Wise, "The Impact of the Basic Educational Opportunity Grant Program on College Enrollments," in E. Helpman et al., *Social Policy Evaluation: An Economic Perspective*, Academic Press, New York, 1983, pp. 123–142.

VI. IMPLICATIONS FOR FURTHER RESEARCH

Results from individual-level enlistment analyses have implications for aggregate data models which focus on state- or national-level data and have been the prevalent mode of analyzing and forecasting enlistments. Our findings suggest that these models should incorporate market segmentation. The models should analyze seniors and graduates separately since their enlistment behavior differs. This separation was once not possible; however, since 1980 the Defense Manpower Data Center has recorded whether each enlistee is a senior or not and, if not, whether he has completed 12 or more years of schooling.

Aggregate models should also include variables that significantly influence individual enlistment behavior. In particular, models should include some measure of average family income, the market share of seniors, and the percentage of seniors who plan to go college. Census and Current Population Survey (CPS) data should be able to provide such measures.[1]

In addition, aggregate models should allow for previous enlistment behavior of cohorts to control for selectivity. As we noted in the preceding section, as a cohort ages, it contains a progressively smaller proportion of individuals who are more likely to enlist.

Such refinements to aggregate models should improve their ability to measure the recruiting potential within defined geographic areas and to forecast the effects of changes in recruiting policy and in economic conditions on enlistments. For example, we expect changes affecting military pay relative to civilian pay to have a relatively greater effect on senior enlistments than on graduate enlistments, particularly in areas or time periods with lower proportions of seniors planning to attend college. A fall in military pay relative to civilian pay will decrease enlistments overall, but the decrease will be greater among senior enlistments. Thus, if the differential response of seniors to changes in the relative wage is not taken into account, aggregate models will underpredict the change in senior enlistments. If recruiting goals are to maintain or increase senior enlistments, such forecasts will be misleading as to the effort needed to meet senior quotas and as to whether senior quotas can realistically be met.

Finally, our results indicate the need for continued and expanded analysis of enlistment at the microlevel. Further segmentation of the

[1]The CPS now includes questions on seniors' education plans.

recruiting market can be studied, such as women vs. men or reserves vs. active. In addition, the supply of enlistees could be analyzed by occupational area. Such an analysis would require expansion of the data to include information on occupation availability in spring 1979 and could use data on specific aptitudes (e.g., individual ASVAB components).

The individual enlistment model could also be refined through the addition of information on recruiters and local labor market conditions. Currently, the microlevel model provides inadequate controls for demand-side factors. Information regarding number of contacts, initiation of contacts, and recruiter incentives and quotas could be used to incorporate recruiter behavior into the model. Refined measures of local labor market conditions could be added to help control for the individual's relative position in the local market. For example, individuals with a low wage in an area with lower than average wages may not have future civilian job prospects that are as attractive as they would be in a high-wage area. If so, the effect of wage on enlistment may be greater in a low-wage area than in a high-wage area.

The model can also be expanded to examine the applicancy/enlistment sequence: who applies (that is, takes the military aptitude tests) and among those who apply, who enlists and why. The model can address questions regarding which enlistment incentives tend to operate primarily through their effect on applicancy or on enlistment given applicancy. Microanalysis could also provide information on the response to enlistment incentives by market segments; for example, do educational benefits tend to draw from the college-bound youth population while enlistment bonuses draw from graduates not expecting further education. Answers to such questions should help improve the allocation and productivity of recruiting resources.

Appendix A

LOGIT REGRESSION RESULTS FOR SENIORS AND GRADUATES

I. Results for Seniors
(*t*-statistics)

Variable	Expect More Education	
	Yes	No
Constant	-2.371	-.968
	(-1.45)	(-.51)
Age when senior	-.400	-.237
Age 17	(-1.81)	(-.84)
Age 19+	.097	.815
	(.23)	(2.08)
AFQT score	-.0044	-.0203
	(-.59)	(-2.06)
Live at home	.175	-.687
	(.42)	(-1.29)
Family income (in thousands)	-.086	-.013
	(-3.22)	(-.92)
Number of siblings	.184	.055
	(3.44)	(1.02)
Expect more education	n.a.	n.a.
Mother's education	.007	.303
	(.16)	(4.58)
Ln hourly wage	-.667	-3.416
	(-.76)	(-3.62)
Weekly hours, employed	.104	-.003
	(6.19)	(-.17)
Ln months on job, employed	-.321	-.153
	(-2.42)	(-1.16)
Not currently employed	-.429	-2.045
	(-.64)	(-2.12)
Weekly hours, not currently employed	.022	-.054
	(1.69)	(-2.48)

I. Results for Seniors
(t-statistics)

Variable	Expect More Education	
	Yes	No
Months not employed	.133	.671
	(1.80)	(5.16)
Not employed last 12 months	.630	-2.816
	(.56)	(-2.46)
Black	-.075	1.097
	(-.24)	(3.06)
Hispanic	-.389	1.73
	(-.99)	(4.26)
AFQT cat. IV (Score 10-30)	-.912	-2.202
	(-1.73)	(-3.64)
Share of seniors and recent grads (proportion)	.204	-1.791
	(.03)	(-.22)
Recruiter density (per thousand population)	-2.228	1.831
	(-1.10)	(.74)
Sample size	881	801
Enlistees	607	631
Nonenlistees	277	170

NOTE: Regression also includes indicator variables for wage less than $2.25/hr, low family income, income missing, and AFQT missing. Coefficients and t-statistics for these variables are available on request. Regression coefficients could not be estimated for variables with empty cells for either choice as such variables become "perfect predictors" in the logit model with infinite magnitude. In such cases, the coefficient field is filled with "—". Levels of significance: .05 $t = \pm 1.96$; .01 $t = \pm 2.58$.

II. Results for Graduates
(*t*-statistics)

Variable	Expect More Education	
	Yes	No
Constant	1.928	4.827
	(1.48)	(3.70)
Age when senior		
Age 17	-.219	.323
	(-1.05)	(1.35)
Age 19+	-.542	.597
	(-1.68)	(1.55)
AFQT score	.0147	-.0196
	(2.26)	(-2.49)
Live at home	.108	.212
	(.36)	(.58)
Family income (in thousands)	.0034	-.0035
	(.34)	(-.27)
Number of siblings	.083	.193
	(1.58)	(4.29)
Expect more education	n.a.	n.a.
Mother's education	-.015	.134
	(-.41)	(3.20)
Some postsecondary education	-.560	-.684
	(-1.89)	(-1.58)
Ln months since school	-.344	-.705
	(-3.50)	(-5.49)
Ln hourly wage	-.618	-1.102
	(-1.87)	(-3.91)
Weekly hours, employed	-.008	-.017
	(-.69)	(-1.58)
Ln months on job, employed	-.233	-.173
	(-2.88)	(-1.73)
Not currently employed	-2.730	-1.737
	(-2.78)	(-1.59)
Weekly hours, not currently employed	.055	.033
	(2.59)	(1.49)
Months not employed	.221	.215
	(2.78)	(2.48)
Not employed last 12 months	-.599	—
	(-.79)	

II. Results for Graduates
(*t*-statistics)

Variable	Expect More Education	
	Yes	No
Black	.510	.148
	(1.93)	(.36)
Hispanic	-.342	.348
	(-.91)	(.77)
AFQT cat. IV (Score 10-30)	.209	-1.145
	(.44)	(-2.25)
Share of seniors and recent grads (proportion)	-18.436	-32.886
	(-2.92)	(-4.64)
Recruiter density (per thousand population)	-.287	-.845
	(-.17)	(-.32)
GED	-.103	2.275
	(-.23)	(5.31)
Sample size	1134	893
Enlistees	795	477
Nonenlistees	339	416

NOTE: Regression also includes indicator variables for low family income, income missing, and AFQT missing. Coefficients and *t*-statistics for these variables are available on request. Regression coefficients could not be estimated for variables with empty cells for either choice as such variables become "perfect predictors" in the logit model with infinite magnitude. In such cases, the coefficient field is filled with "—". Levels of significance: .05 $t = \pm 1.96$; .01 $t = \pm 2.58$.

Appendix B

CHARACTERISTICS OF "TYPICAL" PERSON USED IN PROBABILITIES

I. Characteristics for Seniors

Variable	Expect More Education	
	Yes	No
Age	17	17
AFQT	62	44
Live at home	1	1
Family income	27300	20800
No. siblings	3	3.4
Expect more ed.	1	0
Mother's ed.	12.6	11
Ln hourly wage	1.160	1.179
Wkly hours, emp.	19.7	25.3
Ln months on job	2.56	2.81
Not curr. emp.	0	0
Wkly hrs, not emp.	0	0
Months not emp.	0	0
Not emp. last yr.	0	0
Black	0	0
Hispanic	0	0
AFQT cat. IV	0	0
Share seniors	.150	.153
Recruiter density	.00053	.00053
Wage < $2.25/hr	0	0
Low fam. income	0	0
Fam. inc. missing	0	0
AFQT missing	0	0

II. Characteristics for Graduates		
	Expect More Education	
Variable	Yes	No
Age when senior	17	17
AFQT	56	53
Live at home	1	1
Family income	19660	19800
No. siblings	3.3	3.3
Expect more ed.	1	0
Mother's ed.	12	11.4
Some postsec. ed.	0	0
Ln mos. since sch.	2.59	2.94
Ln hourly wage	1.497	1.591
Wkly hours emp.	40.9	42.1
Ln months on job	2.75	2.88
Not curr. emp.	0	0
Wkly hrs, not emp.	0	0
Months not emp.	0	0
Not emp. last yr.	0	0
Black	0	0
Hispanic	0	0
AFQT cat. IV	0	0
Share seniors	.149	.156
Recruiter density	.00053	.00053
GED	0	0
Low fam. income	0	0
Fam. inc. missing	0	0
AFQT missing	0	0

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